PATENT APPLICATION
ATTORNEY DOCKET NO. 15115.240001

ARTICLE 19 AMENDMENTS and STATEMENT (English Translation)

FOR

PCT/JP2005/002045

TITLE: **SURFACE PLASMON RESONANCE SENSOR**

Description based on Patent Law 19 (1)

The amendment of Claim 1 clarifies that the depth or the height and the width of the concave part or the convex part formed on the surface of the metal layer are both greater than or equal to 20nm and less than or equal to 150nm. In either citation, the relevant numerical value limitation is not explained.

The amendment of Claim 9 clarifies the method of measurement of the sample solution using the surface plasmon sensor chip of the present invention. In either citation, the relevant measurement method is not described.

The amendment of Claim 10 clarifies the aspect of measuring the interaction between the acceptor immobilized at the metal layer and the biomolecules in the sample solution in the method of measurement according to claim 9.

CLAIMS:

1. (After amendment) A surface plasmon resonance sensor chip comprising:

a transparent substrate; and

a metal layer including concave parts or convex parts on a surface and a flat part positioned between the concave parts or the convex parts, and formed so as to cover the surface of the substrate; wherein

the depth and the width of the concave part or the height and the width of the convex part are greater than or equal to 20nm and less than or equal to 150nm.

2. The surface plasmon resonance sensor chip according to claim 1, wherein the substrate is a substrate with a flat surface, and the convex parts are a plurality of metal particles immobilized spaced apart from each other on a metal thin film, which is the flat part.

3. The surface plasmon resonance sensor chip according to claim 1, wherein the substrate is a substrate with a flat surface, and the concave parts or the convex parts are a plurality of microscopic concave parts and convex parts formed spaced apart from each other on a metal thin film, which is the metal layer, the concave part not passing through the metal thin film.

4. The surface plasmon resonance sensor chip according to claim 1, wherein a plurality of microscopic convex parts or microscopic concave parts are formed spaced apart from each other on one surface of the substrate, and the metal layer is formed on the one surface of the substrate so as to reflect the shape of the microscopic convex parts or the microscopic concave parts.

5. The surface plasmon resonance sensor chip according to claim 1,

wherein the material of the metal layer is gold or silver.

6. A method of manufacturing a surface plasmon resonance sensor chip, the method comprising the steps of:

forming a metal thin film on one surface of a substrate through sputtering or deposition;

chemically modifying the surface of the metal thin film; and

immersing the chemically modified substrate into a liquid solution of metal particles.

7. A method of manufacturing a surface plasmon resonance sensor chip, the method comprising the steps of:

immersing one surface of a substrate in a liquid solution of aminosilane coupling agent;

immersing the substrate into a liquid solution of metal particles;

cleaning the substrate; and

forming a metal thin film on the one surface through sputtering or deposition.

8. A surface plasmon resonance sensor comprising:

a surface plasmon resonance sensor chip according to any one of claims 1 to 5;

a prism arranged on the side of the chip not formed with the metal layer;

a light source for irradiating light on the chip through the prism; and

a light detector for measuring the reflectivity of the light by the metal layer.

9. (After amendment) A method of measurement using the surface plasmon resonance sensor chip according to claim 1 to 5; the method comprising the steps of:

contacting sample solution to the metal layer side of the sensor chip;

irradiating the light having different frequency or angle of incidence from the side of the chip not formed with the metal layer from an optical system towards the chip;

detecting the light totally reflected at the interface of the metal layer and the substrate with a light detector;

obtaining at least two resonance frequencies or resonance angles from the intensity of the totally reflected light detected with the light detector; and

simultaneously measuring the change in the index of refraction of the sample solution in the vicinity of the surface of the metal layer based on the change in one of the resonance frequency or the resonance angle from the changes in the two resonance frequencies or the resonance angles and the change in the index of refraction of the sample solution not in the vicinity of the surface of the metal surface based on the change in the other resonance frequency or the resonance angle.

10. (After amendment) The method of measurement according to claim 9, wherein

the sample solution contains biomolecules;

the method further comprising the step of immobilizing acceptors on the metal layer of the sensor chip; and

the presence and the extent of interaction between the biomolecules and the acceptors are obtained based on the change in the index of refraction of the sample solution in the vicinity of the surface of the metal layer.